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Thesis

Working Out Number Opportunities Which Can Be Developed Meaningfully With a Typical Kindergarten Class

Submitted by

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B. S. In Education

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In Partial Fulfillment of Requirement

For The Degree of Master of Education

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PREFACE

The author wishes to express her sincere appreciation of the constant help and advice given by Dr. Wilson throughout the writing of this paper.

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Chapter I

Introducing the Problem

The problem undertaken in this study is to discover the number opportunities which may be developed meaningfully with a typical and normal Kindergarten group.

The specific purpose of this thesis is to report in detail five problem units which have been successfully worked out with a group of normal Kindergarten children.

Two years of experimenting are covered by this study. During the first year there were thirty pupils in the class, ranging in age from four and one-half years to five years and nine months; and during the second year there were thirty-seven pupils covering approximately the same age span.

These children come from a neighborhood of lower socio-economic status. The fathers' occupations are as follows: laborers, paper hanger, real estate manager, assistant shipper, musician, "broken-down" doctor, truck driver, machinist, United States postal clerk, salesman, and many W. P. A. workers.

The mothers are typical home makers. Most of these families live in double houses and have four, five, or six rooms. Some of the larger families live in the tenement blocks which have only four rooms to accomodate as many as five or six in the family. The rent paid per month in this particular community ranges from $25. to $35., - an average of $30. per month.

Some of the mothers work out as domestics, either by the hour or day. Others do sewing for the W. P. A. If there are

very young children in this type of home, the Nursery School, sponsored by the Federal Government, enrolls these children, and cares for them from nine o'clock in the morning until three o'clock in the afternoon. This care includes a mid-day lunch which is not to cost more than ten cents per capita for each meal. This, too, is furnished by the government.

The shopping for groceries is done mainly in typical smaller stores. Those fortunate enough, have cars to take them to a nearby "Mart" for weekly shopping needs. Clothing is bought in local stores and in Boston's department stores' basements. It is quite evident in some cases that the clothing has been furnished by the Welfare.

With a background of this socio-economic status, questions like the following come to the front. Do these children have number experiences? How important or significant are these experiences? Could they be enlarged and made more meaningful through attention and proper development in the schools? What will be the problem outcomes? Will there be greater willingness to undertake experiences that involve numbers? Are there subject matter results that might be discovered and recorded through informal checking?

CHAPTER II

Method

The development of number units at the Kindergarten level was a natural and spontaneous procedure; if numbers came in naturally, they were used. The best units, which have been worked in the class room, during two years, and have proved worth while at the Pre-School level, will be described and evaluated in this paper.

It is hoped that more teachers will be induced to try to develop experiences that involve meaningful numbers, and through them enrich the child's knowledge. "What arithmetic suffers from is lack of rich contacts. The heart of arithmetic must be found in its problems; these should deal with vital subjects and their answer should tell a story."[1] Further, if teachers would attack this procedure with open-mindedness and more enthusiasm, they would soon be profoundly convinced, by the results, that such activities are purposeful.

Teachers who have not tried this method, for various reasons, are apt to be doubting. Careful study of the units here presented should carry convictions as to their value and feasibility.

It is hoped that if such teachers should be inspired to attempt a procedure of this sort, and the results are sufficiently successful to be convincing, that they will be encouraged to continue in a progressive method and not return to a traditional way of teaching.

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[1] McMurry, Frank - What is the Matter with Arithmetic Education - April 1934, vol. 54 p.451

However, the teachers maybe not wholly to blame, since efforts to do progressive work in the schools may meet with difficulties. The teachers may have a feeling of pressure from the administrative powers. Teachers are responsible for definite achievements of their groups. Since these achievements must be accomplished in certain periods of time, and since they want their groups to compare favorably with the scores made by other groups, the teachers resort to the easier method of teaching, page by page, from a text book. It is less effort to measure page by page results than to measure the outcomes of purposeful activity units.

Yet, Blair and Burton have shown very definitely in the Hingham Survey Report that in comparing this town's pupils' achievement in arithmetic with the National Norm (using the Metropolitan Achievement tests, tests of doubtful value, since they are heavily loaded with traditional items) - it was found greatly below the standard. And it has also been recorded that in over 90% of the rooms in the Hingham Elementary School System, the children are taught by the traditional method, such as: reading a text book and writing answers to questions about it, or answering questions orally about it, or answering questions about it in written form in a workbook. "In no single instance has a pupil's need, interest, or purpose been used as the basis of the learning procedure."[1]

It might further be concluded that the teachers are none too anxious to get away from the text book type of recitation

[1] Blair and Burton-Report School Survey Committee, Hingham, Mass. 1939. The Elementary School Program in Hingham pp 75-76

and try something more progressive.[1] It is evidently far easier to assign a certain page than to plan an activity with the group. Why trouble to get information about the children's centers of interest? Why know the community and the possibilities it offers to carry on a purposeful experience? Why make an effort to use class number opportunities to further true meaning in arithmetic? The importance of such knowledge cannot be over estimated, neither can the value of the utilization of such material as a basis for class room activities in building up number concepts be ignored. A better response emanates from child or adult if the learning situations are focused around centers of interest and need.[2] A greater enthusiasm follows, and the learning becomes more challenging, enjoyable, and permanent. When the teacher becomes sufficiently keen to recognize these number opportunities, utilizes them, and provides enrichment through more experiences, she is then truly helping the pupils to grow in number understanding. "Skills are more thoroughly retained and have more meaning when acquired through a real need."[3]

It seems that if the schools are to function in the most helpful way for present and future living, a greater effort should be made to further real life experiences, which in turn might inculcate a better liking for school work, including arithmetic, and develop a democratic attitude toward it.

Yet, difficult addition facts are actually being drilled on as far down as the first grade. Such work has no definite meaning to the child; and too, he has no social usage viewpoint for

[1] Blair and Burton-Report of School Survey Committee, Hingham, Mass. 1939 Pages 69-71
[2] Elementary School Course of Study, Cleveland Heights, Chicago 1930
[3] Jones & Buckley-Arithmetic Activities 1B and 1A, Cleveland Board of Education.

what he is trying to learn. Brownell[1] indicates that such work is detrimental. He says that it may take two or three years to overcome the effects of such meaningless facts and processes by suitable treatment of rich objective experiences.

It is most significant to note that procedures that are routine and meaningless may cause many failures in arithmetic. A small percentage of our college students are following mathematics in any of its forms. Many who are honor students in all other subjects, fail in arithmetic. Why? Is it our attack or the type of material being presented, or both, which are causing avoidance, hate, and failure with our young people? Rogers[2] in an article on "Arithmetic and Emotional Differences in Some University Students", cites some thirty points in the deficiencies of the university students as indicated by their difficulties with the simple quantitative analysis. As the list is read, it is evident that nearly every difficulty is due to lack of proper training, or wrong type of subject matter along the school ladder.

Too many teachers feel that there are not sufficient every day number situations arising in the school room to carry on this type of informal arithmetic. There is evidence to the contrary. One teacher[3] lists some fifty odd number possibilities which could very reasonably be used as a basis for further development of number in grade one.

Table I shows the different number possibilities which occurred in the writer's Kindergarten covering a period of two weeks. These are number opportunities listed from actual obser-

[1] Brownell, W.A.-The Development of Children's Number Ideas in the Primary Grades-University of Chicago, Supplementary Education Monograph 34, Chicago 1928.
[2] Rogers, Charles-Arithmetic and Emotional Differences in Some University Students-Mathematics Teacher-Jan.1939 vol. 32 pp 3-9
[3] Wilson, Stone Dalrymple-Teaching The Arithmetic-Chap.VII p 68-69 McGraw-Hill-New York 1939

TABLE I

Number Situations Occurring in a Kindergarten Room Covering a Period of Two Weeks (10 days) March 18-April 1, 1940

Number Situations Observed	Frequency of occurrence
Counting children present (1-32)	10
Counting children absent (1-5)	10
Counting children who brought lunches (1-32)	10
Counting children who had clean nails, clean handkerchiefs, shoes, etc. (1-32)	10
Counting milk bottles, napkins, straws, crackers for those who had milk (1-15)	10
Talking about names of the days of the week; Easter; Good Friday; number of days in one whole week	4
Choosing the right number of characters for the Peter Rabbit show (6 characters)	1
Asking to have apples, oranges, candy halved	3
Hearing Doctor's Signal (3 bells)	2
Bringing in milk order (20¢) Different denominations of change.	2
Counting those who remembered to bring in Easter eggs to be painted (1-32) 100%	1
Discussing the price of the Flower Show Tickets (1/2 price)	1
Discussing how much to charge for their tickets for the Peter Rabbit Show - 1¢, 2¢ , 5¢ mentioned.	1
Discussing clock-lunch time, 10 o'clock; time to go home, 11:30. Placing movable hands of clock face at these hours.	10

TABLE I

Number Situations Occurring in a Kindergarten Room Covering a Period of Two Weeks (10 days) March 18-April 1, 1940

Number Situations Observed	Frequency of Occurrence
In discussing "Gulliver's Travels", the phrase a few inches tall occurs. The ruler was brought out to show that "few inches tall" isn't very big.	1
Dancing, counting - 2 slides, 3 taps, 3 claps	10
Discussing Easter clothes, suggestions of cost, comparison	3
Preparing and making tickets for our Peter Rabbit Show - Discussing how many to make.	
Red Tickets: Grade 1 - 33; Grade 3 - 30; Grade 4 - 32; Grade 5 - 33; In all 128 — Blue Tickets: Grade 2 - 30; Grades 3&4 27; Grade 6 - 32; 89	10
Weighing and measuring all members of Kindergarten (pounds, feet, and inches)	1
Playing with telephone during free play period-calling numbers (mostly their own numbers)	5
Talking about promotions, the different grades, 1st, 2nd, 3rd, etc., going up the ladder	1
Bringing in a library book and telling the group what date she took it out and when it was to be returned (in 14 days).	1
Playing with ten pins. No score kept, but counting the number of pins knocked down at each trial.	5
Taking right place in line - 1st, 2nd, 3rd, 4th place.	10
Passing crayons, scissors, papers, other material.	7
Making circle for dancing formation, careful of spacing	10
Reading the story "Snip-Snap-Snurr" which contains many number concepts.	2

TABLE I (Concluded)

Number Situations Occurring in a Kindergarten Room Covering a Period of Two Weeks (10 days) March 18-April 1, 1940

Number Situations	Frequency of Occurrence
Counting pennies brought in to buy cookies sold at recess	10
Dramatizing of "Five Little Chickadees".	5
Using yardstick in measuring material to make skirts for costumes.	3
Playing tea party, setting the table for 3-4-5 playmates	5
Playing number games: Hide-and-go-seek Bouncing Ball Jumping Rope	5
Using Arithmetical words frequently: half, as big as, as much as, smaller, bigger, taller, more, little, a lot, some, measure, crowd, each one, etc.	10

tion with the frequencies occuring. The data also show how much worthwhile repetition takes place. It is surprising to note the large span of number experiences that is covered in such a short period of time. The material has the added value of satisfying real needs.

Even as far down as the Kindergarten level, the data show that opportunities arise which involve problems concerned with time, money value, fractions, and measurements. Needs arise that involve counting, planning, and judging accurately.

The keen teacher has excellent opportunity to enrich those experiences, and lead the group into the wider and more informational channels.

"It behooves the Kindergartener to make her curriculum rich and appropriate, and her teaching as functional as possible, since four to six still represents a period in child-life when learning progresses very rapidly."[1]

The teacher should be well informed as to what number background the child brings to the Kindergarten, and exactly how much need he has for number before entering his school life. The Kindergarten teacher realizes.that there is hardly a boy or girl entering school who doesn't know his age and birthday. There have been opportunities for him to shop for mother and neighbors. This has given the child the advantage of handling money such as, penny, nickel, dime, and dollar bill. If there is a car in the family, the child becomes conscious that there are numbers on the plate, and in many instances he can call these

[1]Willy, Dorothy E. - Editorial Childhood Education, Sept. 1938-p4

these symbols by name.

These younger children are conscious of the clock long before they come to school. They hear it striking, and they associate different family activities with it. Whistles which sound at lunch time bring home members of the family for the midday meal. Older brothers and sisters go to school at eight o'clock. The younger members of the household go to bed at seven o'clock. In the majority of homes, rising time is seven o'clock.

If there is a telephone in the home, the small child soon knows his own number and can repeat others most often used. These may be the grocery man's number, father's office telephone number, and his playmate's telephone number.

And so surveys[1] and experiments[2] prove that the child has need for number before he goes to school.

Smith,[3] in her survey, found by personal interview with 400 first grade children at Detroit, some of the uses which these children made of arithmetic in their out-of-school lives. The relative frequencies with which some of the situations, involving arithmetic, mentioned by these children were: transactions carried on in stores 30%, games involving counting 18%, dividing part with playmates or pets 6%, playing 3%, measuring 2%, and setting the table 1%.

Quattlander[2] carried on a similar experiment with her second grade children and found that 90% of them had had some number experiences before entering school.

Now, the job for the teacher is to utilize these experiences

[1]Wilson, Guy M. New Standards in Arithmetic. Jour. of Ed. Research Dec. 1930 Vo. 22 pp. 351-360

[2]Quattlander, E. B. U.Thesis for Master's Degree-Elem. School Jour. April 1926, pp.621-626

[3]Smith N.B.-An Investigation of the Use of Arithmetic in the Out-of-School Life of First Grade Children. Elem. Sch. Jour. Apr. 1924 Vol. 24 p.621-626

as a basis for her everyday activities, and further develop number concepts by leading the children to see the need in the particular problem which they are attempting to solve. "In progressive schools the teacher of younger children is not released from teaching arithmetic; in fact, she is urged to teach it more thoroughly than it was taught in conservative schools. But, she is expected carefully and intelligently to develop number concepts through experience, thus helping children to appreciate the meaning and value of number in concrete situations".[1]

Some of the ways a Kindergarten teacher may approach her group in developing number in concrete situations are as follows: allowing different members of the class to count those absent and those present; counting the number who have clean handkerchiefs; counting those who have brought in lunches; counting those who have brought in pennies to buy cookies; keeping count of the amount of money brought in for milk orders. This last item offers opportunity for change and the experience of dealing with different types of small coins.

Another natural class room number situation is offered when a Junior Red Cross drive is on and the group is asked to bring in contributions which are put in a bank until the time to be counted and collected. Each morning for a week, the money is counted and the sum is written on the blackboard. This is a concrete problem and the meaning and value of number concepts are well illustrated by such an activity. "All[1] are virtually in agreement that the most important part of number work for the

[1] Forest, Isle-The School for the Child From Two to Eight. Chapt. XII, p. 209

young child is his introduction to number relations through concrete problems involving arithmetical concepts."

Oftentimes, when members of the group are ill for a lengthy period, the children like to send a token of thoughtfulness. This may be fruit, a card, notes from the group, or candy. The boys and girls take turns in going to a store to choose and purchase the gift. The children are having an experience that is most meaningful in developing number concepts, and are doing a kindness as well. "Arithmetic should be taught when the child has a need for it and when he has the proper background of experiences to profit by it."[1] When children discuss what they should buy for their sick classmate, and what they might expect to get with the amount of money which they had, they truly discover the value and relationship of money. "The first two years of the school life of the child should be for the purpose of having meaningful experience rather than for the purpose of fixing number facts and processes."[2]

The Kindergarten teacher, because of the elasticity of her class room program, may feel freer to carry on in a more progressive way, she can take the time to plan systematically to build better number situations through further development. As Moore[3] says: "those chance bits of knowledge and skill picked up out of a mass of experience - isn't it worthwhile to utilize every possible opportunity which the class room situations offer every day and at all times throughout the year?"

"The wise pre-school teacher arranges matters so that every

[1] Fourth Year Book of the National Education Association p.174-1929
[2] Woody, Clifford-When Shall Systematic Instruction in Arithmetic Begin? Educ. Method 16:165-168 Jan. 1937
[3] Moore, Annie-The Primary School p.281-Houghton Mifflin Co.

suitable opportunity to clear up the child's idea of number is utilized: she does not teach arithmetic, but she is alive to the possibilities, and the more alert the teacher, the more opportunity the children have to count and estimate and see distances, groups, and quantities in relation to each other."[1]

The teacher learns to choose material that is conducive to the development of beginning number and aids in widening number understanding. The following list is only a suggestion of the many activities that involve number possibilities: Manipulating clocks; playing with pieces of paper of various sizes; stringing chestnuts, beads, popcorn, cranberries; putting puzzles together; playing ten pins, tea party, house and store; making scrapbooks; playing with the telephone; playing with the movable hands of the clock; playing dominoes; counting while bouncing the ball; and serving the milk and luncheons at recess time. All these experiences, which the Kindergarten child engages in, help him to realize the true meaning of number. "Knowledge to be real must be founded on actual experiences of the individual learner. Knowledge to be retained must be given an opportunity for use."[2]

Again, the teacher has opportunity to enrich these number situations by her choice of songs and rhythmics. Many songs suggest the number meaning. The following are typical: "The Clock in the School Room," "The Frog," "Five Little Chickadees," "Three Ships-a-Salilin," "Mulberry Bush" (enumerating the days of the week) "Three Robin Redbreasts," "Sing a Song of Sixpence," "One Little, Two Little Indians."

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[1]Forest, Isle-The School for the Child From Two to Eight Chapter XII - p. 285

[2]Stone, John C. How to Teach Primary Number - p.3 B.H.Sanborn 1930

Ring games, too, offer great possibilities for developing number consciousness at this age level. Here are some of the best known: "Baa, Baa Black Sheep," "Go In and Out the Windows," "Looby Loo," "Hickory, Dickory Dock," "Three Little Kittens," "Diddle, Diddle, Dumpling, My Son John." Other good games are "Hide and Go Seek," "Tag," "Mailman," "Telephone Operator," "Jack Stones" and "Ten Pins." These games have definite number situations in them. Since the child may participate and enjoy these games, the learning will be more permanent.

Rhythmics suggest excellent number possibilities. Motions like skipping, hopping, skating, flying, marching, clapping, etc., have a definite number response. The dances that the child learns at this age help to encourage a response to a certain number of slides, steps, taps, twirls, claps, etc. The toy orchestra is most signigicant in getting over number understanding as: the bells play three times, rest three times, the rhythm sticks play four times, then the cymbals and drums take turns to play three or four times. This gets the mind into a definite routine, response, and readiness.

Literature must not be overlooked in helping to build up number concepts at this age level. Here will be found a wealth of material from which to draw. Stories like the "Three Bears," "Three Little Pigs," "Gingerbread Boy," "The Wolf and the Seven Kids," "Little Black Sambo," "Chicken Little," "Brennan Town Musicians," "The Old Woman and the Ox," "Clementine," "The Flying Pig," "The Little Rabbit Who Would Not Eat," are excellent for

inclucating and widening number knowledge.

Dramatization must not be forgotten in this readiness program. This activity offers some fine real life situations in which the child finds himself working. For instance, there is the responsibility of remembering the number of characters needed for a play; of knowing how many properties are wanted and where to place them; of planning and making the costumes for the play; of learning a certain number of lines and knowing the time to speak them. This requires judgment and measuring.

Then, further, there is the planning of parties and writing invitations which lead the pupils to a great many natural number contacts. For instance: consulting the calendar for the month, day, and date; bringing out the importance of the clock as to the time for the entertainment; and actual buying of groceries and necessities for the activity engaged in. These experiences are direct outcomes of a need and have definite social value, social usage, and permanence.

The units, as developed in this thesis, will use many of the preceding suggestions and methods. Each experience has grown out of a natural need, a discussion or a suggestion by some member of the Kindergarten. It will be seen that the children have had ample opportunity to plan, use judgment, shop, gain time consciousness, handle money, refer to the calendar, and become acquainted with the days of the week.

Specific outcomes will be indicated at the close of each unit. A general evaluation of the five units will be found on

pages forty-seven and forty-eight.

The following units have been written as they have been worked out in the writer's Kindergarten. The conversation, which took place as the various units developed, has not been recorded, but the main points have been listed faithfully.

The first unit to be described centers around Mothers' Day.

CHAPTER III

Problem Units

a. A MOTHERS' DAY UNIT IN THE KINDERGARTEN

Two years ago the thirty children in the Kindergarten ranging in age from 4-6 to 5-9, wanted to do something to show their appreciation of their mothers. This was in connection with Mothers' Day that comes the second Sunday in May. It was a natural desire.

We[1] discussed this topic in our morning circle, some of the things that would be interesting to do. This group had many pupils who were much above normal in intelligence and achievement. Suggestions came quite readily. Some members of the group suggested making a card; some thought that making paper flowers would be nice; and still others felt that a party would be a very good idea. We then took a vote on these three suggestions. Someone counted the number for each idea. Needless to say, the party suggestion was the most popular.

Then followed about two weeks of planning and preparing. We decided that we should have refreshments served at the party. Also, there should be some entertainment offered for the visitors. Invitations had to be made and sent out to the mothers.

The children realized that refreshments cost money and they would have to go to the store to buy them. We are fortunate as there is an Economy Chain Store in the immediate neighborhood. The three or four boys and girls who lived near this store were to be responsible for the prices. Then came the question of

[1] It is felt by the writer that "we" rather than "they" expresses a more cooperative relationship that existed between the children and teacher, during the study and working out the units.

what would be best to serve and where to get the money? After a long discussion from the viewpoint of mothers' parties, ginger ale and Ritz crackers with peanut butter were decided upon. Then too, it would be necessary to know how many mothers were coming, so that there would be no unnecessary waste of the refreshments.

The children were now faced with the problem of securing money for the purchasing of the food. Finally, it was decided that they would not use their allowance money for cookies (which we sell at recess at school) nor candy, nor ice cream cones. If I remember correctly we collected a little over a dollar (about one dollar and twenty-five cents). This would buy the necessary refreshments and would leave some extra pennies. The children who lived near the "Ecco" reported that Ritz crackers (large Size) were fifteen cents a package, peanut butter was fifteen cents a jar, and a case of ginger ale, twelve bottles, was eighty-seven cents with an allowance of two cents on each empty bottle returned.

By this time word had been received that twenty-five mothers were coming to the party. Was there enough of everything? The children counted the number of crackers in the Ritz box, and found about one hundred and thirty. This was compared with the twenty-five who were coming. Of course one hundred and thirty was found "a lot more" than twenty-five. In fact fifty peanut butter sandwiches could easily be made with one hundred and thirty crackers and some would be left over. The gingerale had

to be measured. The children counted the dozen ginger ale bottles in the case and found that a dozen and twelve were just the same. Now, the group wondered if these twelve bottles would serve the twenty-five coming guests. The children did not have to buy Lily paper cups as these are furnished as part of the Kindergarten requisitions. We have the smaller size cup, so the children experimented and found that there are three smaller size cupfuls in each bottle. (Someone had brought an empty bottle.) That settled the refreshment problem!

The children then turned to making the invitations. These were made out of a piece of cream drawing paper (6x9) and folded in the middle. On the outside were drawn (popping out of the grass) four or five gaily colored tulips. Inside the card were printed these words:

Come to Mothers' Day Party-May 12, 1938

at 2 o'clock

in our Kindergarten

Names were printed or signed, according to each individual's accomplishments.

When the time element on the invitation was reached, the calendar and the clock played a most important part. We have a face of a clock with movable hands, and the members of the group were given ample opportunity to set the different hours. These hours, it is most interesting to note, were closely associated with some activity that took place in the children's own experiences. Ten o'clock was easily learned. This is our recess

and milk serving period. Seven o'clock, too, offered no difficulty to be mastered. This represents getting up in the morning and going to bed at night. Twelve o'clock is very easily remembered. At that hour the knitting mill in the community blows its whistle. It was difficult for the group to realize that before twelve was in the morning and after twelve was afternoon. The mothers were to come at two o'clock in the afternoon, since most visitors come after twelve o'clock. The children made faces of the clock, putting the numbers in Arabic. We used an open brass fastener to serve for clock hands. The effect wasn't too bad. The children were given a real reason for writing numbers.

The boys were responsible for the chairs. They had to go to the different rooms and ask for chairs until they had the right number needed, twenty-five.

Both boys and girls prepared the Ritz sandwiches and measured out the right number of glasses for the ginger ale.

The napkins, also part of the Kindergarten equipment, were folded neatly and put in readiness on the serving table. These too, had to be counted, eighty in number.

Turning to the entertainment side of the unit, many quantitative ideas were involved in the games, poems, and songs. For suggestions take the following:
"Three Robin Redbreasts", "Five Little Chicadees", "Two Little Blackbirds", "Sing a Song of Sixpence", "Baa-baa Black Sheep", "Hickory, Dickory, Dock", "The School Room Clock", "One, Two Buckle My Shoe".

Specific Advantages of Mothers' Day Unit are as follows:

1. The children were responsible for bringing in their pennies, nickels, and dimes to save for definite objective, the sum of one dollar and twenty-five cents.
2. They learned the prices of peanut butter, crackers, and a case of ginger ale, by going and actually making purchases.
3. They learned by experimenting and measuring the number of cupfulls of ginger ale in a bottle.
4. They had need to count twenty-five chairs. It was necessary to count one hundred and thirty Ritz crackers, for preparing sandwiches for company. It was necessary to have the right number of napkins ready (eighty).
5. Both boys and girls prepared the peanut butter sandwiches, sixty-five in all.
6. The children were led to realize that morning and afternoon were two parts in the day.
7. There was definite attention given to the clock, stressing the hours, ten, seven, twelve, two, and eleven.
8. The children learned that twelve and a dozen are one and the same thing.
9. The calendar and the names of the days of the week were much in evidence.

MAKING APPLE SAUCE IN THE KINDERGARTEN

It was Thanksgiving time and the Kindergarten had been talking about the meaning of this holiday. The mothers' preparation for the family and friends was mentioned, cooking the turkey, fixing the vegetables, and making the pies. Many of the children helped in the kitchen. They were asked if they would like to make some apple sauce in the Kindergarten. They liked this idea and one of the little girls said: "It makes me growed up like my mother." We then discussed what we were going to do with it when it was made.

The class was asked, "What did the Pilgrims do with their food at the Thanksgiving Feast?"

"They shared it with the Indians!"

"Well, with whom could we share our apple sauce?" It was then decided to invite the first grade. Invitations were planned and one was printed on the blackboard. This brought in the calender and days of the week. Each one did his best and printed an invitation. The best one was chosen and delivered to Grade I.

Now, who were going to take care of the buying of the necessary articles? The class chose one pupil from the group. This little girl lived near the "Ecco". She was given thirty-five cents. The group worked out the list of things needed.

This list was put on the board.

1 pound apples	5¢
1/2 pound sugar	3¢
2 pounds soda crackers	22¢
	30¢

The next morning she brought the supplies from the grocery store. The apples cost five cents. For the sugar she paid

Kindergarten Children Who Helped
to Serve the Apple Sauce

three cents. The crackers were twenty-two cents for a two pound box. She spent thirty cents in all and brought back five cents, or a nickel.

Many of the girls brought in an apron and a knife. The boys, too, came in with knives. The school is provided with an electric plate and a scale. The apples, five of them, weighed just one pound. The box of crackers weighed exactly two pounds. Those who had brought in a knife had the first opportunity of paring the apples. We first halved and quartered, and finally we cut them into smaller pieces. These children were generous; they let the other children, who had not brought knives, use theirs and do some of the paring. All had a chance to prepare the apples. Our attention was then turned to what we would put with the apples, to prevent them from burning. We needed water. We had to use almost three glassfulls of water to cover the apples so they would not burn.

The children's attention was drawn to the clock to see if they could puzzle out how long it took the apples to cook. This did not mean much to the group but they did realize that the hands moved. It took the apples fifteen minutes to cook. Each child had a chance to stir the sauce while it was cooking and also taste it. Mary Ann, who is most grown up, put the sugar in, tasted it, and let many of her friends do likewise. We used wooden throat sticks for the tasting procedure. Mary Ann then poured the sauce into a dish which was set near the window to cool.

The following morning, the day before Thanksgiving, was to

Mary Ann Who Helped to
Make the Apple Sauce

be the great event. This was a busy morning for the Kindergarten. It was necessary to count and find how many were in the Kindergarten that day. Someone went down to Grade I and asked how many were coming. It was the same as in the Kindergarten.

On the blackboard: 32 in Kindergarten

$\frac{32}{64}$ in Grade I

The class cannot add concretely, but abstractly they know that 2+2=4. Also that 3+3=6. They were told that they would need 64 crackers in all. Eight or nine of the girls took care of this and suggested making extras for unexpected guests. The boys folded and counted out the napkins, 74 in all. There was little trouble in counting concretely, except at the digits as: 29-30; 39-40 etc.

At eleven o'clock the guests came. The entertainment committee did some dances and finger plays for them. "Sing a Song of Sixpence" was also dramatized. This song brings in a very natural lesson in subtraction. Four and twenty is the same as twenty-four, only another way of saying it. Twenty-four blackbirds were counted to be in the pie. In "Baa-Baa Black Sheep" there is a number situation, "three bags full", and then they have to be enumerated as "<u>one</u> for my master, <u>one</u> for my dame and <u>one</u> for the little girl who cries in the lane."

Refreshments were served by the Kindergarten children.

Everyone said that the Apple Sauce Party was delightful, and all had a happy time.

The specific outcomes of a unit like this are plain.

1. The children were working in a natural situation, planning, buying, cooking, and taking care of money.
2. They had definite need to count; the number in their group, the number of napkins needed, and the crackers which had to be prepared.
3. The vocabulary was enlarged. Words like pound, scale, half, quarter, glassfull, dishfull, spoonfull, time, how much, how many, measure, were used many times and in natural situations.
4. Much attention was paid to the clock, by allowing different members of the group to fix the hands of the clock at different hours.

C. THE KINDERGARTEN GOES SHOPPING AT CHRISTMAS TIME

Christmas is one time of the year when motivation is not overworked. The children are sufficiently primed with the excitement and preparations of the season's spirit to be easily led into an activity. The Christmas spirit should be capitalized by the school.

We had been discussing Christmas shopping. We, too, had been talking about the origin of the custom of giving presents. Every year, each pupil in the room exchanges names, and then buys a five or ten cent present for the boy or girl whose name is on the slip of paper which he has drawn. Up to this year, each child had bought his present when he went shopping with some member of the family, Mother, Dad, or an older brother or sister. Often, the teacher was asked to purchase the gift. This year the children were asked if they would like to go Christmas shopping to the five and ten cent store with the class and the teacher. They liked this idea.

The class decided to make the trip the week before school closed for the holidays. In the meantime many of the group had been earning the nickel or dime. Some helped at home drying the dishes. Others did errands at the store for mother or a neighbor. Still others saved the nickel which they usually would spend for candy or ice cream. This money was brought in and put in a box. As each child brought in his money his name and the amount was put on the blackboard as:

Gloria brought in her 5¢
Leo brought in his 10¢
Mary Ann brought in 2 nickels

The money was brought in three denominations, pennies, nickels, and dimes. The children soon knew that two nickels or one nickel and five pennies, or ten pennies make a dime.

In the morning circle we discussed some of the possible purchases that they might consider. These articles were listed and priced on the board, as:

Coloring book--10¢ for 1
Crayons-------- 5¢ and 10¢ a box
Handkerchiefs-- 5¢ and 10¢ for 1
Toys---------- 5¢ and 10¢ for 1
Sewing Set-----10¢ for a box
Hair Ribbon----10¢ for a yard
Story Books----10¢ for 1
Tool Sets------10¢ for 1 card

This helped the children to have some idea of the value of some of these articles.

Finally on the planned morning, we went to shop. Incidentally, it might be mentioned here, that some of the children's homes were passed, and it was interesting to note the different members telling the others the numbers of their houses. Autos that were parked along the way, gave us great opportunity to recognize and call out the numbers that were familiar to the Kindergarten children.

It was necessary to cross the street to get to the Five and Ten Cent Store, so we had a lesson in safety, waiting for the lights to turn red and yellow, The officer was most helpful and friendly, and the children waved and returned his smile

by way of thanking him.

In the store, the group made no excessive noise. There was a busy hum of voices, and once in a while a loud laugh rang through the store when some one saw or said something funny.

There was no trouble with the pupils touching or picking up articles from the counters. The right way to conduct themselves in a store had been discussed in the morning circle.

It was interesting to see that many of the group could read ten cents and five cents on the price tags on the counters.

The toy and book counters were the most popular, needless to say. The crayon and handkerchief counters came a close second.

The pupils selected and paid for their presents, with only a few suggestions from the teacher. They knew what they wanted and paid for it. It was interesting as well as amusing to see these little people (just five years old) counting the correct change, two nickels, or ten pennies, or one nickel and five pennies to pay for their packages.

Some of the pupils had an extra dime or nickel and they bought rolls of Christmas wrapping paper and ribbon. Still others purchased packages of assorted tags and seals.

When the shopping was finished the group returned to the school.

The group noted that they left the school at nine o'clock and got back about half past ten. The clock face with the movable hands was brought out, and different members of the

group moved the hands to represent the time of leaving and the time of returning. Incidentally, other hours were talked about, such as twelve o'clock, lunch time, five o'clock father comes home, seven o'clock time for Kindergarten children to be in bed.

During the play period, there was great evidence of the morning shopping experience. One group of the children dramatized going to the store and used their presents, which they had bought, to be sold at the play store. The Kindergarten has some toy money, and there was some difficulty in getting enough of the five cent, and ten cent, and penny pieces since there was such a demand for them. They had chosen two store keepers and used the regular Kindergarten tables as the counter.

Some of the other children made colored balls for the Christmas tree. Many of these balls were labeled five cents, ten cents, and three for ten cents for the smaller ones. Some of the pupils put the paper ornaments on the Kindergarten tree; others took theirs home for their own Christmas trees.

Still a smaller number wrapped their presents to go on the tree since they had brought the necessary tyings.

This unit was started soon after Thanksgiving since the children needed to save their money or work for the necessary ten cents to buy the present. The unit did not require every day discussions before the time for shopping. We, however, counted the money in each of the classes every morning to see how much had already been brought in, and how much more was needed to make a dime or ten cents for each pupil.

There were thirty-four children taking part in this unit. The ages ranged from four years and six months to five years and ten months.

The specific advantages of an experience like this are many. A few of the important ones are:

1. The children realized the true concept of 10¢.
2. They were exposed to reading automobile numbers and house numbers.
3. The children were allowed to make their own choices in selecting the gifts, which gave them an opportunity to exercise judgment and responsibility as to what to buy.
4. The children earned or saved the necessary money.
5. The members of the group recognized 5¢ and 10¢ on the signs in the store.
6. A lesson in safety was taught and experienced.
7. The clock was referred to as a measure of time.
8. There was carry-over into the "free play" period, during which many of the experiences of the shopping tour were reenacted or extended, such as making labels for objects that were drawn, making number plates to put on the toy trucks, and playing store.

d. MAKING A VALENTINE BOX

IN THE KINDERGARTEN

It has been customary for the Kindergarten valentine box to be made either by the practice teacher or some older children in the building. But this year, the group was asked if they would like to make the box. The group thought that this would be fun.

The class discovered by investigation and by being told that they would need a heavy box to hold the valentines. It would have to be quite large to hold so many valentines since practically every boy and girl in the school would put at least one in the box. That would be about two hundred fifty in all.

One little boy offered to bring in a box and he chose two others to help him with it. These pupils would be responsible for the box.

The next question that came up was what would be best for covering the box, and what color or colors should be used. Crepe paper was thought to be best for a cover since it "didn't cost much money and made things look pretty".

The group was divided on the color so a count was taken: those who wanted the box covered with red crepe paper against those who wanted it covered with pink crepe paper. The majority wanted pink. The vote was fifteen to twenty. These people were counted and twenty was shown to be larger than fifteen.

Two pupils were chosen to buy the pink crepe paper. It was suggested that it would make a prettier box to use another color with the pink. This color was white. So Ann and Shirley

said they were going to the Five and Ten Cent Store to buy the crepe paper. They were given twenty cents.

In the morning the two girls brought the paper to school. They told the class that one package of paper cost five cents. They needed two packages which cost ten cents. so they brought back ten cents.

These sentences were put on the blackboard.

Ann and Shirley paid 10¢ for our crepe paper.
They had 20¢
They brought back 10¢
10¢+10¢= 20¢

In the meanwhile the box had been brought in. It was a very good selection. It was a National Biscuit Company cardboard box that fig newtons come in. The grocery man had been most kind.

Now we were ready for work. Some of the group traced and cut out silver paper hearts, cupids, and stars to paste on the box. Others were busy using the ruler. It was these pupils' first experience in handling a ruler for a definite purpose. There was no actual placing of dots and drawing of lines with the ruler at this point, but the strips came out fairly accurately. The right number of strips had to be made to cover all sides of the box since we alternated pink and white. With fluted edges, it made an attractive covering.

The silver paper objects were pasted on at the correct distances.

The making of the cover was rather difficult and required considerable manipulation since a slot had to be cut out for the valentines to be put in. Then the crepe paper had to be fitted around this slot.

This unit was short. But much pleasure was derived from it because the children had prepared the box themselves. The individuals in the group delighted in telling visitors about the covering of the valentine box and how they had used the ruler.

Specific Outcomes of This Unit:

1. Actual manipulation and definite usage of the ruler in response to a need for it.
2. Going to the store and buying the needed material. Purchasing, handling money, and returning change was a true life experience.

e. PUTTING ON A "PETER RABBIT" SHOW

The whole unit really began after the marionettes from the Massachusetts Society for the Prevention of Cruelty to Animals had been at the school giving the play "Hansel and Gretel". The children were greatly interested in the puppets and thought that they would like to have a play.

Since the writer felt that marionettes were too difficult for Kindergarten children to make and manipulate, it was suggested that the children themselves be the actors in a play.

This idea was accepted. What story would they like to dramatize? This was hard to decide as the group knew many favorite stories. But after much discussion, the choice was simmered down to three favorites. A vote was taken on these three, "Little Black Sambo", "Peter Rabbit", and "The Naughty Little Rabbit". Since it was Easter time and the children had been discussing rabbits, had visited some belonging to an upper grade boy, and had seen various sized rabbits in the store windows, "Peter Rabbit" was finally agreed upon by vote.

From the first, the children took charge, and were much more mature in planning this unit than the one back in November.

The children chose the characters needed. With some guidance from the teacher, they discussed who were best suited for the different parts. There were six characters needed in all, Mother Rabbit, Mr. MacGregor, three good little rabbits and naughty Peter.

The group was so familiar with the story that the dialogue was not difficult for them to work out mostly by themselves. It was not always the exact phrases used. Some words were added, some taken away, but in the main, the important thought was remembered. What more was needed!

Some members of the class offered to make the vegetables. So they made lettuce, carrots, and cabbages from green and orange crepe papers stuffed with cotton, with the edges sewed or glued together. Members of the group made three heads of lettuce, three cabbages, and five carrots.

Three of the class went to the five and ten cent store and bought the necessary crepe paper.

This was put on the board:

> Marie paid 5¢ for dark green crepe paper.
> Bernard paid 5¢ for light green crepe paper.
> Abbot paid 5¢ for orange crepe paper.
> In all, they spent 15¢.

Many pupils brought in copies of the "Peter Rabbit" book either from home, library, or a friend. The illustrations in these books helped us when making the costumes.

Some of the boys and girls who were planning on making the costumes either brought in material or bought it. Those who bought material were able to tell the group that cloth was sold by the yard, and how much it cost. The yard stick was brought out at this point, and the material which these children had brought in was measured to show the other members how it was done.

Two Kindergarten Girls
Who Worked on the
Poster

The next two weeks we were busy cutting, sewing, trying on costumes and rabbit faces. The children did well with the sewing, but the cutting was somewhat difficult for them, especially cutting the two eyes, nose and mouth of the rabbit masks. Hems and seams had to be kept even and straight. The skirts had to be tried on to see if they fitted properly. The Kindergarten was turned into a sewing room.

Then one morning, in our circle discussion, a little girl said that we ought to have tickets as we do when we go to a "really" show. With great enthusiasm the class responded.

The tickets were made out of red and blue construction paper. These tickets were 4" X 1".

On each ticket was printed:

P E T E R R A B B I T

S H O W

1¢ May 31, 1940 1¢

The class made about one hundred and twenty eight of these tickets, enough for the primary and upper grades and a few extras for emergency.

We practiced buying tickets three or four times. Each member took turns selling them. All other members of the class, furnished with pennies, nickels, and dimes, came up and bought a certain number of tickets.

The one who did the best at making change, was the one chosen to sell the tickets to the other grades.

Another group made a poster to advertise their "Peter

Two Kindergarten Boys Who Helped to Make and Sell the Tickets for the Peter Rabbit Show

Rabbit" play. This poster was exhibited in the lower hall.

It is quite obvious that a number of facts were involved in a situation of this kind.. The whole set-up was most real and decidedly educational. The children had a marvelous time, and they were having a great deal of practise in contacting number facts.

There were some pupils responsible for the properties. These were the vegetables, the quart boxes for the blackberries, the broom and dusters, the market basket, a cup and spoon for the camomile tea, and last but not least, the costumes. All these had to be ready and put in the correct places.

There were one hundred tickets sold and many more pennies were put in the box. About one dollar and fifty cents was collected.

We have not yet definitely decided for what the money is to be spent. Some suggested buying more toys for the Kindergarten. Others said to use it for our final good-bye party in June. Lastly, the suggestion has been made to keep it to buy remembrances for sick playmates.

Specific Advantages of the Peter Rabbit Show.

1. The group became definitely acquainted with the number six.
2. They were responsible for the properties.
3. Those who made the costumes realized what a hem and seam were, and also that they must be kept straight.
4. The whole class observed a use of the yard stick when

the material was measured.

5. A new concept was born in the word "fit", a term meaning measurement and accuracy.
6. The group gained direct experience in making and selling the tickets, including giving back the correct change.
7. True concept of three and five were gained. There were three heads of lettuce, five carrots, and five heads of cabbage for the vegetable garden.
8. There were definite advantages from the discussion as to just what the group plans to do with the money, one dollar and fifty cents. This very concretely teaches money value and relationship.
9. The group became familiar with a quart box which was used as a container for the blackberries.

General Evaluation of the Units Described In This Paper.

This thesis attempts to answer the question as to whether or not appropriate number experiences maybe found for Kindergarten children. The record as given, will carry conviction to many who read it. The writer enumerates the following brief evaluations of the units described.

It is hoped that by helping to put meaningful number understandings in the mind of the child through actual experiences and participation, greater appreciation and better judgment will develop in higher grades. Further, by developing this number consciousness and following it through, there should be less confusion and much clearer understanding farther up in the grades.

The knowledge may not be remembered longer, but because of the natural, enjoyable situations through which the learning takes place, the associations will be clear and pleasureable.

It is obvious that a closer relationship is established between the home and the school. The school becomes less formal, and more homelike with activity of this kind. Such procedures give much opportunity for social growth and help the child to develop a harmonious attitude in planning, working, and sharing experiences together.[1]

Social arithmetic will prepare the child to meet similar situations more intelligently and with better judgment, outside of school, now and later. This may be illustrated in the fifth unit where the child experiences selling tickets and making change.

The child learns much arithmetical knowledge through such

[1] N.E.A. Dept. of Supt. Third Yearbook June, 1926 p. 107

activities, and has a better opportunity to enter into newer informational areas by more and wider experiences than in the usual formal procedures.[1]

The group learns through true life situations the usage and value of pennies, nickels, dimes, yardstick, scales, quart, hem, seam, tablespoon, clock, and calendar.

The teaching is constantly vitalized as the work at the Kindergarten level takes on direct relationship to real life.

There is excellent opportunity to integrate other subjects in experiences of this kind.

Many of the songs and poems used for the entertainment part of the units, have very definite number concepts.

The carry over from these units into the "Free Activity" period is noticeable and important.

Incidentally, the child's arithmetical vocabulary is enlarged. The words deeper, larger, much, more, dollars, cents, and measure, are used at various times.

In the above enumeration, the writer has endeavored to make it clear that, in her opinion, Kindergarten children can be inducted into experiences that involve considerable number concepts, and that the number phases of such experiences can become meaningful to them.

[1] Jones C. Buckley "Arithmetic Activities" Cleveland Board of Education 1931 1 BC LA Activities.

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